XX. A LIST OF THE DRAGONFLIES RECORDED FROM THE INDIAN EMPIRE WITH SPECIAL REFERENCE TO THE COLLECTION OF THE INDIAN MUSEUM.

PART II. THE FAMILY AGRIONINAE.

A. The sections Podolestes, Platycnemis, Platysticta and Protoneura.

By F. F. Laidlaw, *M.A.*

(Plates XIII—XV.)

Introduction.

The following account deals with four sections (or legions to use Selys' term) of the Agrionidae (=Coenagrioninae of Kirby's Catalogue.)

The family is the largest of the sub-order Zygoptera; it consists of insects which are for the most part small and delicate, and its species are numerous and often exceedingly abundant in individuals. It is in fact a dominant family of existing Odonata.

In the Eastern tropics, so far as my observations go, and probably in most parts of the world this holds good, the members of the family falling into one or other of two great biological groups :—

I. Those which appear not to be affected adversely by human activities, have a wide distribution as species, and are abundant in cultivated country; and probably pass their larval stages in still or stagnant water. Such for example are the species of the genus *Ischnura* and of *Agriocnemis*, which thrive in the environs even of a great city like Calcutta.

II. Forms whose habitat is uncleared forest and uncultivated land, which tend to disappear with the advent of cultivation; whose larvae probably live for the most part in running water. It is noteworthy that such forms as a rule retain certain characters that may be regarded as primitive, though, beyond question, many of them exhibit extreme specialization in certain directions.

The sections of the family dealt with in the present paper may be grouped mainly in the latter of these biological divisions.

Many of them are rare, or dwell in regions difficult of access, so that it is not surprising to find amongst them a considerable number of new species.

In discussing these and other members of the group, most of which are but little known, I have found it advisable to suggest certain modifications in the accepted classification. Hence this part is more lengthy than that dealing with the Calopterygidae.

I have again to acknowledge my thanks to Messrs H. and F. W. Campion for admirable wing-photographs. I am also indebted to the former for much helpful advice and criticism.

References to Selys' systematic writings on the Agrioninae are given where necessary, for the sake of brevity, as follows :—

Synopsis=*Bull. Acad. Belg.* (2) x, p. 12 *seq.* (1860).
Revision=*Mém. Couv.* xxxviii, p. 8 *seq.* (1886).
Odonates de Birmanie=*Ann. Mus. Civ. Genova* (2) x, p. 433 *seq.* (1891).

I hope to complete this account of the Agrionidae in a subsequent paper dealing with the section or legion " Agrion," with as little delay as possible.

Family AGRIONIDAE.

Genus.	*Species.*	*Range.*
I. Legion Podolestes.		Tropical continental lands, New Caledonia.
1. *Argiolestes.*		Himalaya to Burma, Australia, New Caledonia.
	1. *melanothorax*, Selys.	Himalaya to Burma.
II. Legion Platycnemis.		Old-world Temperate and Tropical lands to New Guinea.
2. *Coeliccia.*		Himalaya, Indo-China to Formosa, Malaya.
	2. *renifera*, Selys.	Himalaya to Assam.
	3. *didyma*, Selys.*	Himalaya.
	4. *bimaculata*, Laidlaw.	Assam.
3. *Calicnemis.*		Himalaya to Burma and Tonkin.
	5. *eximia*, Selys.	Kumaon to Tonkin.
	6. *miles*, n. nov.*	Burma.
	7. *erythromelas*, Selys.*	Burma, Tonkin.
	8. *miniata*, Selys.	Himalaya.
	9. *pulverulans*, Selys.	Himalaya to Assam.
	10. *chromothorax*, Selys.*	Burma.
	11. *mortoni*, n. sp.	Himalaya.
4. *Indocnemis.*		Himalaya, W. China, Malay Peninsula.
	12. *kempi*, n. sp.	Himalaya.
5. *Copera.*		Oriental region to Damascus and Madagascar.
	13. *annulata*, Selys.	India, Burma to Formosa.
	14. *vittata* (races), Selys.	India, Assam, Tonkin, Malaya to Borneo.
	15. *marginipes*, Ramb.	India, Indo-China, Malaya.

Genus.	*Species.*	*Range.*
III. Legion Platysticta.		Tropical America, Tropical Asia to New Guinea.
6. *Platysticta.*		Ceylon, S. India.
	16. *maculata*, Selys.*	Ceylon.
	17. *apicalis*, Kirby.*	Ceylon.
	18. *deccanensis*, Laidlaw.	Deccan.
7. *Drepanosticta.*		India, Indo-China, Malaya, Papua.
	19. *carmichaeli* (Laidlaw).	Himalaya.
	20. *tropica* (Selys).*	Ceylon.
	21. ? *montana* (Selys).*	Ceylon.
	22. *digna* (Selys).*	Ceylon.
	23. *hilaris* (Selys).	Ceylon.
	24. *quadrata* (Selys).*	Burma, Malay Peninsula.
8. *Protosticta.*		India, Malaya, Celebes.
	25. *gravelyi*, Laidlaw.	Deccan.
	26. *himalaiaca*, n. sp.	Darjiling to Assam.
IV. Legion Protoneura.		Tropical America, Africa, Oriental Region, Papua, Australia.
9. *Chloroneura.*		Central India.
	27. *quadrimaculata* (Ramb.).	Central India.
10. *Disparoneura.*		
	28. *tenax.**	Ceylon.
	29. *caesia* *	Ceylon.
	30. *pruinosa.**	Ceylon.
	31. *occlusa.**	Ceylon.
	32. *tetrica*, n. sp.	Deccan.
	33. *nigerrima*, n. sp.	Central India.
	34. *atkinsoni*, Selys.*	Burma.
11. *Disparoneura.*	35. ? *westermanni* *	Nilgiri Hills.
12. *Indoneura.*		W. Penisular India.
	36. *gomphoides* (Ramb.)	
13. *Caconeura.*		Ceylon, Burma, Malaya.
	37. *sita* (Kirby).*	Ceylon.
	38. *verticalis* (Selys).*	Burma to Borneo.
	39. *interrupta* (Selys).*	Burma to Singapore.

Species marked with an asterisk are not in the Indian Museum collection. I have, however, been able to examine examples of most of these either in the collection of the British Museum or elsewhere.

Legion I. Podagrion, Selys.

Genus **Argiolestes**, Selys.

Argiolestes melanothorax, Selys.

(Pl. xv, fig. 1).

Argiolestes melanothorax, Selys, *Ann. Mus. Civ. Genova* (2) x. p. 500 (1891).
,, ,, Ris, in *Nova Caledonia, (Zoologie)*, Vol. II, L. 1, No. 1 (1915).
See also Calvert, *Proc. Acad. Nat. Sci. Philadelphia*, 1913, p. 260.

3 ♂ 1 ♀ Darjiling district.
2 ♂ 1 ♀ Gopaldhara, Darjiling district (*H. Stevens*).

Kashmir and Baluchistan.

II { Platycnemis 1

Himalaya.

I { Argiolestes 1

III { Protosticta 1
Drepanosticta 1

II { Coeliccia 2
Calicnemis 4
Indocnemis 1

IV { —

Central India.

I { —

III { —

II { Copera

IV { *Chloroneura* 1
Disparoneura 1

Deccan.

I { —

III { *Platysticta* 1
Protosticta 1

II { Copera

IV { *Indoneura* 1
Disparoneura 1
(D. ? westermanni 1)

Ceylon.

I { —

III { *Platysticta* 2.
Drepanosticta 4.

II { Copera

IV { Disparoneura 4.
Caconeura 1.

Assam.

I { Argiolestes 1

III { Protosticta 1
Drepanosticta 1

II { Coeliccia 2
Calicnemis 3
Copera 2
Indocnemis ?

IV { —

Burma.

I { Argiolestes 1

III { ?

II { Coeliccia ?
Indocnemis ?
Calicnemis 4
Copera 2

IV { Disparoneura 1
Caconeura

Malaya.

I { *Amphilestes*
Podolestes

Indo-China.

I *Rhipidolestes.*

Tonkin.

II { *Calicnemis* 3.

I=Legion Podolestes.
II= ,, Platycnemis.
III= ,, Platysticta.
IV= ,, Protoneura.

Genera in italics are endemic.

Under Calvert's rubric (*loc. cit.*) this species should fall into the genus *Wahnesia* of Forster. This genus cannot stand ; its type species has not been described. As, moreover, Dr. Ris is not disposed to subdivide the genus *Argiolestes* on our present imperfect knowledge, the present species is best left as before, though it is probably generically apart from the Australian species.

No other representative of the 'Legion' has been recorded within the limits of the Indian Empire ; and S. India and Ceylon are at present, I believe, the only large tropical continental areas without such representation.

Legion II. PLATYCNEMIS.

Diagnostic table for the Indian genera.

A. Upper side of quadrilateral shorter than lower side by at least one-fifth of the length of the latter in the fore-wing, usually by more than this.
i. Wing petiolated to the level of Ac.
Wing relatively long and narrow ; usually 2 or 3 cells between the quadrilateral and the sub-nodus.

COELICCIA, Kirby.

Type : *Coeliccia membranipes* (Ramb.).
Distribution : Himalaya, Formosa, Malaya.

ii. Wing ceasing to be petiolated before the level of Ac.
Wing [1] relatively long and narrow, 4 cells between the quadrilateral and sub-nodus. Reticulation very dense (over 300 cells on the hinder-wing).

INDOCNEMIS, n. gen.

Type : *Indocnemis kempi*, n. sp.
Distribution : Assam, ? W. China.

Wing [2] relatively broad and rounded, 3 cells between the quadrilateral and sub-nodus. Reticulation on the fore-wing not so dense (not more than 250 cells on the hinder-wing).

CALICNEMIS, Selys.

Type : *Calicnemis eximia*, Selys.
Distribution : Himalaya, Burma, Tonkin.

B. Upper and lower sides of quadrilateral nearly equal.
Third joint of antennae equal in length to second joint.

COPERA, Kirby.

Type : *Copera marginipes* (Ramb.).
Distribution : Oriental Region, Madagascar.

It may be added that the larvae of A (probably) inhabit quick running streams, of B, so far as is known, slow moving or still water.

Genus **Indocnemis**, nov.

The genus is to some extent intermediate between *Coeliccia* and *Calicnemis*, and probably more primitive than either.

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[1] *Indocnemis*, hind-wing length to breadth, 68 : 12.
[2] *Calicnemis*, hind-wing length to breadth, 57 : 12 (in *C. pulverulans*).

Indocnemis kempi, sp. nov.

(Pl. xv, fig. 2).

1 ♂ Cheerapunji, Assam, 4000 ft , 2-9-x-14 (*S. W. Kemp*).

Wings hyaline, slightly smoky, pterostigma black, one and a half times as long as broad, covering one and a half cells. Post-nodals on fore-wing 22. Length of abdomen 51 mm.; of hinder-wing 38 mm.

Head entirely black save for a pair of small, oval, post-ocular marks on the occiput, which are blue.

Prothorax and *thorax* black, the latter with a pair of ante-humeral bands of blue, extending for about two-thirds of the length of the dorsum of the thorax, pointed at both ends and broader below.

Abdomen, legs and anal appendages entirely black, save that the basal two-thirds of the lower pair of appendages are brown. The upper pair are about three-quarters the length of the lower pair, triangular when viewed from above, carrying each two teeth at the ends of a crescentic projection on their under surface. Lower pair slender, rather cylindrical but broad at the base; incurved at their free extremities, and hooked downwards (text-fig. 1).

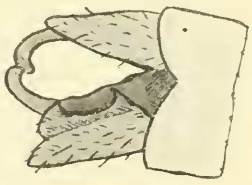

Fig. 1.—*Indocnemis kempi*, sp. nov.
Anal appendages ♂, from above.

Ris (*Supplementa Entomologica*, Berlin, No. I, 1912, p. 67) notes a female probably of this species from Tsa-Yui-San, in Kwangtun, under the name *Coeliccia? orang* (Forster).

Forster's species *Trichocnemis orang* [Forster, in Laidlaw, *Fasc. Malay.* (*Zool.*), Pt. 4, p. 2 (1907)—Perak, coll. Forster] is distinctly smaller.

Its dimensions according to Forster are :—

Length of abdomen 46 mm., of hinder-wing 33 mm.
,, ,, ,, 43 mm. ,, ,, 32 mm.

I do not know the species, which is probably congeneric with *I. kempi*.

Type (male) in the Indian Museum, No. 8200/20.

With this species I have associated the name of Mr. S. W. Kemp of the Zoological Survery of India.

Genus **Calicnemis**, Selys.

Calicnemis mortoni, sp. nov.

1 ♂ Pashok, Darjiling district, 5500 ft., June, 1916 (*F. H. Gravely*).

Wings hyaline, pterostigma black, covering one and a half cells.

Post-nodals on fore-wing 21. Length of abdomen 36 mm., of hinder-wing 29 mm.

Body slender when compared with that of the three common species discussed below. Colouring almost entirely black, with the following exceptions:—

Head.—A small oblique yellow mark on either side of the posterior ocelli, and a narrow transverse line of the same colour on either side of the occiput.

Prothorax.—A minute yellow spot on either side of the middle lobe of the dorsum.

Thorax.—The interalar space is cherry red.

Abdomen.—Segment 1 is dull brown. Dorsum of segment 2 and the base of segment 3 cherry red.

Legs and anal appendages black.

Anal appendages.—Upper pair two-thirds the length of the lower pair, twice as long as the tenth segment; nearly straight, digitiform, each with a small tooth downwardly directed near its base on the under side. Lower pair slender, cylindrical, slightly uncurved, and with a slight downward hook at their apices.

Type (male) in the Indian Museum, No. 3463/H.I.

I have named this species after Mr. K. J. Morton of Edinburgh.

Calicnemis chromothorax, Selys.

Calicnemis chromothorax, Selys, *Ann. Mus. Civ. Genova* (2) x, pp. 70-71 (1891).

This handsome Burmese species is, I imagine, more closely related to *C. mortoni* than to other species of the genus.

The anal appendages of the male appear very similar to those of *C. mortoni*, and in both the abdomen can be described as slender.

Selys' statement as to the length of the hind-wing of the female seems to be a misprint. For the male it is given as from 22-26, for the female 38-40 mm.

Calicnemis eximia, Selys.

Calicnemis eximia, Kirby, *Cat. Ordonata*, p. 131 (1890).
,, ,, Selys, *Ann. Mus. Civ. Genova* (2) x, p. 72 (1891).
,, ,, Martin, *Mission Pavie* [Nevroptères] (sep.), p. 18 (1904).
Calicnemis atkinsoni, Selys, *Ann. Mus. Civ. Genova*, (2) x, p. 72 (1891) ♀.

Kumaon is probably near the western limit of the genus.

The female described by Selys as that of *C. atkinsoni* is a female of the present species. Hence a new name is required for the male referred to that species: it appears distinct from any of the other members of the genus. The female referred to *C. eximia* by Selys in his synopsis belongs really to the next species, *C. miniata*, Selys.

I give below an account of a female of *C. eximia* taken *in copula* with a male.

Head.—Lower and anterior surfaces yellow, as far as the level of the anterior ocellus, with a black line running from eye to eye at the level of the base of the antennae; the two basal joints of the antennae yellow, the remainder black. The yellow colour of the frons has a distinct greenish tinge. The occiput is black with a narrow linear yellow mark lying transversely on either side.

Fig. 2.—*Calicnemis eximia*, Selys. Abdomen ♀, seen from above.

The eyes are yellow for their lower two-thirds, the upper third is brown; the brown colour is separated from the yellow by a darker margin which runs latitudinally, and joins the black transverse band on the frons at the level of the base of the ocelli.

Prothorax.—Dorsally black, yellow at the sides and below.

Throax.—Dorsum black with rather broad yellow antehumeral bands; sides and under-surface yellow with a black band at the level of the second lateral suture.

Abdomen yellow; the first segment with a fine black basal triangle; the remaining segments all with a broad bronze-brown longitudinal band dorsally occupying their whole length. On segments 2–6 this band is narrowed at the base of the segment, so that each of these segments has a small pair of basal yellow lunules when looked at from above; segment 7 has a similar narrowing apically, whilst segments 8–9 show both basal and apical lunules. The sternal plates of segments 2–7 are also brown, except at their extremities (text-fig. 2).

The legs are yellow; the two anterior pairs have a slight orange tinge, and the posterior surfaces of the femurs have each a brown line. The pterostigma is brown. Superior anal appendages yellow.

Calicnemis miniata, Selys.

Calicnemis miniata, Kirby, *Cat. Odonata*, p. 131 (1890).
Calicnemis eximia, Selys, *Synopsis*, p. 160 (♀)?

♂ ♂ ♀ ♀ Gopaldhara, Darjiling district (*H. Stevens*).
♂ ♂ ♀ ♀ Darjiling district.

The female of this species does not appear to have been described fully.

Head.—Lower and upper lip, ante- and post-clypeus yellow; the ante-clypeus with a pair of black spots, the post-clypeus with

a rectangular black mark, genae and frons as far as the level of the base of the antennae greenish-yellow, the rest of the head black, with a transverse yellow band from eye to eye at the level of the anterior ocellus, and a fine yellow line on either side of the occiput, the lower two-thirds of the eyes greenish-yellow, the upper third black.

Prothorax.—Dorsum black, the sides and under surface yellow.

Thorax.—Black above, with greenish-yellow antehumeral bands, rather narrower than those of *C. eximia*; sides and under surface yellow with a black line on the second lateral suture.

Abdomen reddish-brown, segments 1–6 with a terminal black band, becoming broader on segment 6. Segment 1 with a black triangle dorsally occupying its whole length (in mature females). A fine black line runs along the mid-dorsal carina of the first six segments, it is however scarcely evident on segments 5 and 6 of fully mature females. The remaining abdominal segments are entirely black, save for some traces of reddish-brown at the base of 7. Superior appendages black.

Legs yellow, the posterior surfaces of the femurs with broad black line, and the posterior parts of the tibias brown, tarsi black.

Pterostigma very dark brown, almost black.

Calicnemis pulverulans, Selys.

(Pl. xv, fig. 3).

Calicnemis pulverulans, Kirby, *Cat. Ordonata*, p. 131 (1890).

♂ ♂ ♀ ♀ Darjiling district.

♂ ♂ ♀ ♀ Gopaldhara, Darjiling district (*H. Stevens*).

♂ Young. *Head.*—Lower lip yellow, upper lip black with yellow margin, genae and lower two-thirds of eyes pale greenish-yellow, the rest of the head black save for a narrow yellow band running across the frons immediately in front of the anterior ocellus, and a pair of narrow linear yellow marks on the occiput behind the eyes.

Prothorax black dorsally, sides and under surface pale yellow.

Thorax black above with broad pale yellow antehumeral bands; pale yellow at the sides and below with a black line on the second lateral suture.

Abdomen yellowish-brown, paler below, the posterior segments becoming progressively darker, the last three being entirely black. Sutures marked with a black ring, the apices of segments 2–6 with a very fine pale yellow ring, incomplete in the mid-dorsal line. Anal appendages yellowish-brown, legs black, base of femurs yellow, especially anteriorly.

As the male becomes mature its colouring becomes rapidly darker.

A fully adult male has the margin of the upper lip and genae still yellow; the yellow markings on the frons and occiput are replaced by blue primrose marks. The yellow of the prothorax, and

the yellow antehumeral thoracic marks are similarly altered ; the sides of the thorax are more extensively marked with black. The abdomen is almost entirely black, segments 4–5 showing some dark brown colour. The anterior segments especially have a blue pruinescence ; the legs are entirely black, pulverulent like the abdomen.

Lastly, an old male is almost entirely black, the only colouring being on the extreme of the upper lip, which still remains yellow, and the lower two-thirds of the eyes, which are of a bluish-green colour. The sides of the thorax have become entirely black, the pruinescence is retained on the top of the head, and on the antehumeral bands of the thorax. The black of the abdomen is intense and metallic.

♀ *Young.*—Colouring almost identical with that of the young male, the chief difference seems to be that the yellow margin of the upper lip is more extensive than in the male sex.

The first indication of approaching melanism is the appearance of a narrow, very dark brown band, running longitudinally on the dorsum of abdominal segments 2–4, whilst the remaining distal segments pass progressively from very dark brown to black.

It may be remarked that at this stage the female bears some resemblance in colour pattern to that of *C. eximia.*

A female coloured thus was taken *in copula* with a male in the ' all black ' stage.

More adult females pass through the same colour change as the males, reaching ultimately the condition of blackness relieved only by the pale yellowish green of the lower part of the eyes ; in this state also they are taken mating.

The three species noted above are evidently at least locally abundant, and presumably occur together, as I have before me bottles containing spirit specimens of two or in some cases three species apparently collected indiscriminately and in considerable numbers.

The remaining species of the genus must be very rare on the Himalayan range, or more probably do not occur there at all, as they are unrepresented in the Museum collection and in Mr. Stevens' series.

Calicnemis miles, nom. nov.

The synonymy involved here is as follows :—

(1) *Calicnemis eximia*, Selys, *Synopsis*, 1863.
,, ,, race *atkinsoni* ♀, *Revision*, 1886.
,, ,, *atkinsoni* ♀, *Odonates de Birmanie*, 1891.
(2) *Calicnemis miniata*, Selys, *Revision*, 1886.
,, *eximia* ♀, *Synopsis*, 1863.
(3) Sp. *innominata* = *miles*.
Calicnemis atkinsoni ♂, *Odonates de Birmanie*, 1891.

Table of the species of *Calicnemis*.

♂ A. Legs yellow or orange.
i. Abdomen entirely scarlet ... ... *C. eximia*, Selys.
ii. Abdomen with black articular rings, segments 9, 10 dark.
C. miles, n. n.

B. Legs largely black.
  i. Abdomen slender, 35 mm. or more in length.
    a. Thorax black (in *adult* male) ... *C. mortoni*, sp. n.
    b. Thorax largely brilliant chrome yellow.
      C. chromothorax, Selys.
  ii. Abdomen stout, about 30 mm. long or less.
    a. Abdomen of young males yellow marked with black, of adult males brownish-black or entirely black.
      C. pulverulans, Selys.
    b. Abdomen dark carmine-red marked with black.
      1. Upper lip red-brown, lower anal appendages longer than upper pair ... ... *C. miniata*, Selys.
      2. Upper lip black, lower anal appendages not longer than upper pair ... ... *C. erythromelas*, Selys.

♀ A. Legs yellow.
Dorsum of abdomen bronze-green (in adult). *C. eximia*, Selys.

B. Legs largely black.
  i. Abdomen yellow with black marks.
    a. Terminal segments black (or whole abdomen black in fully adult specimens ... *C. pulverulans*, Selys.
    b. Terminal segments marked with yellow.
      C. chromothorax, Selys.
  ii. Abdomen crimson with black marks.
    a. Upper lip black ... ... *C. erythromelas*, Selys.
    b. Upper lip red-brown ... .. *C. miniata*, Selys.

Genus **Coeliccia**, Kirby.

I regret to find that I have caused considerable confusion in the synonymy of this genus. It is one where adequate material is very necessary, as the species are decidedly difficult. I take the opportunity here of correcting my previous mistakes.

Species of the genus will probably prove numerous; from Borneo I have seen several undescribed forms. The structure of the anal appendages of the male and of the prothorax of the female are of especial importance in discriminating the species.

The genus has been divided by Selys with two sections dependent on the position of the sectors M3, RS, with regard to the subnodal cross vein.

It is possible that some use may be made of the thoracic colour pattern in grouping the species according as to whether :—

(*a*) Males and females both have an 'antehumeral' band (as in *C. membranipes*).

(*b*) Males have round or oval spots on either side of the thoracic carina, females with antehumeral band (*e.g. C. renifera*, Selys).

(*c*) Both sexes have round or oval spots on either side of the thoracic carina (*e g. C. flavicauda*, Ris).

Presumably those species falling under (*c*) are the most specialized, at any rate as regards colour.

The thoracic colour pattern is certainly very interesting; species of the genus have apparently evolved, within the limits of the genus, an arrangement widely different from their allies. But

the whole 'Legion' is characterized by a tendency to originality in colouring.

The grouping of the species adopted by Selys, which depends on the position of M3, RS, relative to the subnodal cross-vein, seems to be a natural one as it is supported by the geographical distribution of the species.

Thus the species agreeing with *C. renifera* in this respect are all found in the Himalaic mountain complex and its outlying spurs; those akin to *C. membranipes* are more definitely Malayan with their headquarters in Borneo. In the accompanying table I have attempted to give the chief characteristics of the *C. renifera* group so far as they are known to me. The table is, of course, largely compiled from Dr. Ris' article on species of the genus (*Supplementa Entomologica*, No. 1, 1912, pp. 61–67; Berlin).

Martin has recorded *C. octogesima* (Selys), *C. renifera* (Selys), and *C. membranipes* (Ramb.) from Tonkin (Martin, *Mission Pavie* (Nevroptères), 1904). I think it possible that the Tonkinese form of *C. renifera*, at any rate, may prove to be distinct from species of the type locality.

Table.

M_3 proximal to nodus, MS distal.
- Costal side of quadrilateral of fore-wing about one-third shorter than anal side.
  - Space between quadrilateral and subnodus normally with two cross-veins (*i.e.* 3-celled).
    - *a.* Costal side of pterostigma about one-third shorter than anal side.
      - ♂ segments 9, 10 blue; thorax of ♂ and ♀ similar. *C. brachysticta*, Ris.—Philippine Is.
    - *b.* Costal and anal sides of pterostigma sub-equal.
      - i. ♂ segments 9, 10 orange; anal appendages orange; thorax of ♂ and ♀ similar. *C. flavicauda*, Ris.—Formosa.
      - ii. ♂ segments 9, 10 black (marked with blue), anal appendages black; thorax of ♀ with complete antehumeral band. *C. erici*, n. sp.—Malay Peninsula.
      - iii. ♂ segments 9, 10 largely blue, anal appendages brown; thorax of ♀ with complete antehumeral band. *C. simillima*, n. sp.—Malay Peninsula.
  - Costal side of quadrilateral of fore-wing about one-fifth shorter than anal side.
    - I. Space between quadrilateral and subnodus normally with one cross-vein. *C. bimaculata*, Laidlaw.—Assam. (? = *C. didyma*, Selys).
    - II. Space between quadrilateral and subnodus normally with two cross-veins.
      - i. ♂ segments 9, 10 and anal appendages blue; thorax of ♀ with narrow antehumeral band. *C. cyanomelas*, Ris.—Formosa.
      - ii. ♂ segments 9, 10 (adult) and anal appendages black; thorax of ♀ with complete antehumeral band. *C. renifera* (Selys).—Himalaya.

A specimen in the British Museum from the Chin Hills labelled *Coeliccia didyma* is certainly quite distinct from *C. bimaculata*. I

have not been able to satisfy myself that this specimen is certainly the true *didyma*, but as I had no sufficient time to examine it fully I can give no reason for supposing that it is not correctly referred to that species.

Coeliccia renifera, Selys.

(Pl. xiii, figs. 1–3; pl. xiv, fig. 3).

Coeliccia renifera, Kirby, *Cat. Odonata*, p. 128 (1890).

9 ♂ ad., 4 ♂ juv., 4 ♀ ad. Pashok, 2000-4000 ft., Darjiling dist., 7—14-vi-16 (*F. H. Gravely*).

♂ Abdomen 44 mm., hind-wing 27·5 mm.

♀ ,, 40 mm., ,, ,, 27·5 mm.

♂ *Adult.*—Lower lip and lower two-thirds of eyes yellowish-green. Rest of head and upper surface of eyes black, except the anteclypeus and genae which are silvery blue, and a small yellow transverse post-ocular mark.

Prothorax entirely black.

Thorax black with a pair of oval-oblong, silvery blue spots on either side of the mid-dorsal carina, extending from below for about half its length; and a large mark of the same colour laterally divided into two by a black line along the second lateral suture.

Abdomen brownish-black, paler below; at the apex of each segment from the third to the eighth is a paired ventro-lateral spot of a bluish-white colour.

Legs white. Posterior surfaces of femurs, anterior surface of tibias black, likewise tarsi and spines.

Anal appendages white, the tips of lower pair black.

♂ Juv.—Black marks on head not nearly so developed as in adult. The upper lip is yellowish-white, and there is a broad yellowish band running from one eye to the other across the head at the level of the anterior ocellus. Upper third of eyes abruptly darker than lower parts.

Prothorax entirely yellow, with the exception of the anterior and posterior margins which are marked with black.

Thorax brownish-black dorsally, with well-marked antehumeral stripes, exactly matching those of the female, and internally to these are the oval markings of the adult male; these along their border coalesce with the antehumeral band. Sides and under surface of thorax pale yellow, with vestige of black stripe along the second lateral suture.

Abdomen pale brown, darker at articulations. Segments 9 and 10 whitish-yellow.

♀ *Adult.*—Coloured much as the young male, but with the anteclypeus black, and the dorsum of the thorax entirely without the oval markings characteristic of the male. The dorsal parts of segments 4, 5 are more darkly coloured than in the young male, and the posterior half of 9 and the whole of 10 is of a whitish-yellow.

Coeliccia erici, sp. nov.

Trichocnemis renifer, Laidlaw (nec. Selys), *Fasc. Malay.* (Zool.) IV, p. 2 (1907).

1 ♂ 2 ♀ ♀ Bukit Besar, Jalor, Malay Peninsula, 2500 ft.

♂ Abdomen 45 mm., hind-wing 26 mm.
♀ ,, 40 mm., hind-wing 27 mm.

♂ *Head* (damaged).—Upper lip metallic black, genae ? blue. Rest of dorsal surface black, with a pair of small wedge-shaped post-ocular blue spots.

Prothorax (damaged).—Largely black, probably a yellow spot on either side.

Thorax.—Dorsum black as far as first lateral suture, marked in front on either side of the mid-dorsal carina along its lower two-fifths with a very large almost circular spot of bright blue. This spot appears to be homologous not only with the oval spot of *C. renifera*, but also to include the persistent lower end of the antehumeral band. Sides and lower surface pale yellow with an incomplete black band at the second lateral suture.

Abdomen.—Segments 1, 2 black above; 3–8 brown, darker at the articular rings; 9, 10 black (probably) marked with blue dorsally; anal appendages blackish-brown. Upper pair longer than lower pair, and when viewed from above flattened and truncate. In profile they appear shaped rather like the blade of a table knife, and each carries two small downwardly directed teeth separated from one another by a concave edge. Lower pair stout, of the shape characteristic of the genus, curved inwards to meet each other at their extremities, and at the same time hooked downwards (text-fig. 3).

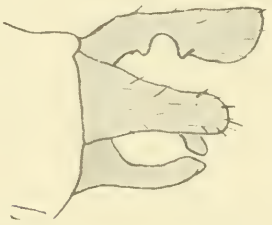

Fig. 3.—*Coeliccia erici*, sp. nov. Anal appendages ♂, obliquely from above.

♀ (much damaged). Head as in male ?

Prothorax with a very large yellow mark on either side of middle line separated by fine back line, anterior and posterior lobes black. Posterior margin gently concave, with minute projection backwards in the middle line.

Thorax with broad yellow antehumeral bands.

Abdomen dark brown, passing to black-brown apically. Segments 8, 9 with apical dorsal, crescentic yellow mark.

I have named this species after a soldier who fell in 1915 and also after my little son his cousin.

Coeliccia simillima, sp. nov.

Trichocnemis octogesima, Laidlaw (nec Selys), *Fasc. Malay.* (Zool.) IV, p. 4 (1907).

4 ♂ ♂ 1 ♀ Bukit Besar, April, May, September, 2000 ft.

♂ Abdomen 40 mm., hind-wing 26 mm.
♀ (much shrivelled) ,, 25·5 mm.

"Thorax sky-blue and black; abdomen black with blue tip."

♂ *Adult.*—Head black, anteclypeus and genae blue. Post-ocular marks of the same colour, almost circular.

Prothorax black, with a pair of small lateral spots which are blue.

Thorax black above, a pair of oblong-oval blue spots on either side of the mid-dorsal carina, extending to about the lower two-fifths of its length, and above these a much smaller pair of linear blue marks. Sides and under surface yellow with black line along second lateral suture.

Abdomen.—Segments 1–2 black, with some yellow at the sides, and a small median dorsal blue line on 2; 3–8 brownish-black, each with a very small pair of yellow spots laterally at its apex; 9–10 blue above, basal third of 9 black. Anal appendages: upper pair black, tipped with yellowish-white at the extremity; with a fine black basal tooth, and a larger hook-like projection at the end of the middle third, both directed downwards; apex subacute. Lower pair brown, pincer-like, a little longer than the upper pair.

♀ In poor condition, immature and shrivelled. The thorax shows a pair of yellow antehumeral bands.

It is evident that this species strongly resembles *C. octogesima* (Selys). I have not access to any authentic example of the latter species and the published descriptions are not very full. It would appear to be smaller than *C. simillima*, and to differ in details of colouration. Granting the venational characters to be constant there should be no difficulty in separating the two species.

Coeliccia didyma, Selys.

Coeliccia didyma, Kirby, *Cat. Odonata*, p. 123 (1890).

I have not seen an authentic example.

Coeliccia bimaculata, Laidlaw.

Coeliccia bimaculata, Laidlaw, *Rec. Ind. Mus.* VIII, iv, p. 341, pl. xvi, fig. 1 (1914).

1 ♂ Abor Expedition.

The specimen is rather immature. The statement that the space between the quadrilateral and nodus is occupied by a single cell is true only for one wing, the right hind-wing, the other wings in each case have two cells in the space, *i.e.* one cross nerve, the latter condition is probably normal.

Unfortunately the account of *C. didyma* is not very full, and it is not possible at the present time to see the type specimen. I note the following differences between the description of *C. didyma* and the type of *C. bimaculata*.

	C. didyma.	*C. bimaculata.*
Prothorax	Black with large light round spot on each side.	Yellow with anterior and posterior margins black.
Thorax	An upper pair of small blue spots near the wings on the dorsum.	Upper pair of spots absent.
Abdomen	Segment 1 black above, yellow at the sides.	Segment 1 yellow with semicircular brown mark anteriorly.
Size	Hind-wing 24 mm.	Hind-wing 22 mm.

It must be noted that the anal appendages of the described specimens are very similar.

Coeliccia albicauda (Forster).

Trichocnemis octogesima albicauda, Forster (as race).
Trichocnemis borneensis, Laidlaw (nec. Selys), *loc. cit.*

Some time ago I re-examined the male specimen which I had regarded as probably belonging to Selys' species. I found it to agree with the form described by Forster as a race of *octogesima*, and now believe it to have been identical with that form, which is certainly distinct from the true *octogesima* and worthy of specific rank. Unfortunately the two specimens, male and female, taken *in copula* at Kwala Aring have been destroyed in the meantime.

I have examined specimens of several species from Borneo. male and female, and find so much resemblance amongst the females that in my opinion it will be a matter of no little difficulty to determine in the future what is the male of the real *borneensis*.

The present species differs then obviously from *C. octogesima* in that the female has no antehumeral band; and is also almost certainly distinct from *C. borneensis*.

It is to be hoped that material from the type locality may be forthcoming, which will settle the question.

I have been able to identify a larval form from Kalimpong as belonging to *Calicnemis* (No. 85/H.I., April-May, 1910, F. H. Gravely). It is very different in appearance from the larva of *Copera annulata*, its legs are relatively short, the body stouter and instead of the very long gill lamellae of *Copera* there are very short strongly ridged lamellae, shaped like a spear-head, triradiate in transverse section, not so long as the mask. The differences between the two larvas are so striking as to suggest that the two genera are not really closely related, but show a convergent similarity in their venation. A point of interest and one that will perhaps help to throw light on the question is that in the *Calicnemis* larva I have been able to determine that the tracheae which supply *RS* and M_3 rise from a common stalk from the main trunk of *M*. This feature may be the explanation of the remarkable venation found in *Prionocnemis*.

Genus **Copera**, Kirby.

(= *Psilocnemis*, Selys).

Copera annulata (Selys).

Copera annulata, Kirby, *Cat. Odonata*, p. 129 (1890).
Copera annulata stevensi, Laidlaw, *Rec. Ind. Mus.* VIII, iv, p. 341, pl. xvi, fig. 2 (1914).

1 ♂ North Lakhimpur, foot of hills, Upper Assam (*H. Stevens*) (type of *stevensi*).

1 ♂ with larval skin, from Museum tank, Calcutta, emerged April 4th, 1915, No. 3015/21.

Selys (*Revision*) expresses the opinion that there is but a single species ranging from Japan to Sumatra and Assam which includes perhaps varieties and not local races. He observes that the females cannot be distinguished. The ' races ' named are :—

C. subannulata (Selys).—Tenasserim, Calcutta.
,, *ciliata* (Selys).—Malacca.
,, *serapica* (Selys).—Nicobars.
,, *stevensi* (Laidlaw) —Assam.

It is evident that the species is one of which long series are necessary for determining the value of the differences which exist between individuals.

The larval skin is incomplete and lacks the mask. I hope later to publish an account of the larval forms of Indian dragonflies, so will not attempt an account here beyond that the legs are long and slender, and the caudal lamellae are linear-lanceolate, occupying about two-fifths of the total length of the larva.

Copera marginipes (Ramb.).

(Pl. xiv, fig. 2).

Copera marginipes, Kirby, *Cat. Odonata*, p. 129 (1890).
,, ,, Martin, *Mission Pavie* [Nevropteres] (sep.), p. 18.
Psilocnemis marginipes, Kruger, *Stettin Ent. Zeit.* 1898, p. 102.

1 ♂ Parambikulam, 700–3200 ft., Cochin State, September, 1914 (*F. H. Gravely*). No. 8265/H.I.

2 ♂ ♂ 2 ♀ ♀ Nagpur, C.P., 1000 ft., August, 1915 (*E. D'Abreu*).

1 ♂ Mormugao, Portuguese India, August 1916. No. 4369/H.I.

This species is characterized by the moderate dilatation of the two hinder pairs of tibias in the male, and by the very short superior anal appendages of the same sex These are about one-quarter as long as the stout lower pair This well-known species shows striking age variations.

Young males and females are white, the abdominal segments ringed with black, giving a very striking, almost ghostly, appearance to the living insect. Adult specimens appear almost black, the legs bright orange.

The eyes as seen in spirit specimens have a remarkable appearance. The upper and lower poles are of pale gray ; there is a fine equatorial belt of the same colour and on either side of this a narrow zone of brownish-black. The upper of these zones is continuous with the dark transverse line on the frons.

Locally this species, which is widely spread, seems to vary but little. Specimens from the Malay Peninsula, with which I have been able to compare Indian examples, have perhaps a more pronounced white mark at the apex of abdominal segment 8. Otherwise there seems to be no differences of importance.

Copera vittata (Selys).

Copera vittata, Kirby, *Cat. Odonata*, p. 129 (1890).
,, ,, see Förster in Laidlaw, *Fasc. Malay.* (Zool.) iv, 2, p. 7.
,, ,, Laidlaw, *Rec. Ind. Mus.* VIII. iv, p. 342.

The males of this species are characterized by the absence or slight indication of dilatation of the four posterior tibias, and by the length of the upper pair of anal appendages, which equals one-half (roughly speaking) that of the lower pair.

In the case of this species it is possible to recognize a certain number of races which appear to be quite clearly defined.

I have been able to compare specimens from three localities only, from Borneo, Assam, and Cochin State, S. India; the adult of the typical race from the Malay Peninsula is unknown to me. Also I regret I have not more than a few specimens available in each case, and no females from Assam.

The Bornean race *C. vittata atomaria*, Selys, is very distinct, the upper surface almost entirely black; in the adult the antehumeral bands of the thorax are obsolescent, segment 10 of the abdomen remains yellowish-white, and the upper surfaces of the anal appendages are of the same colour. The legs are of a rich orange-brown and the tibias show no indication of lateral dilatation.

Length of hind-wing 19 mm., of abdomen 32 mm.

The Assam race *C. vittata assamensis*, Laidlaw, is largely russet-brown in colour, notably the vertex which in the other two races noted here is intense black. Likewise the upper surface of the abdomen is dark brown, and the white apical mark begins on segment 9. The legs are brown, quite different from the reddish legs of *C. atomaria*, or the bright yellow legs of the next race.

Copera vittata deccanensis, subsp. nov.

2 ♂ 1 ♀ Parambikulam.

♂ Adult. *Head.*—Upper lip, genae and anteclypeus greenish-white, frons and occiput black, with a broad creamy-white transverse band covering the ocelli. A pair of linear post-ocular lines.

Prothorax black above, with lateral yellow marks, bright lemon-yellow below.

Thorax black dorsally, creamy white antehumeral bands present, sides yellow, mottled with black.

Abdomen black, segment 2 with fine longitudinal yellow line dorsally; 4–7 with small apical bluish-white lunules, 9 white above, 10 entirely white.

Anal appendages.—Upper pair white, lower pair white tipped with black.

Legs lemon-yellow, the posterior pairs of tibias distinctly though slightly dilated.

Length of hind-wing 16·5 mm., of abdomen 29 mm.

The female is coloured as the male, though duller, the legs and under surface of the thorax being of a dull white. On segment 9 of the abdomen is a square apical white mark. Segment 10 is

brown below, and the general colour of the abdomen is rich brown, not black.

The adult of the Bornean race is very distinct in appearance. In fact it bears at first sight a close likeness to certain species of *Caconeura* (especially to *Caconeura verticalis*, Selys) with which I have more than once received it. The rich brown-red colour of the legs and the almost entirely black body give it an appearance strikingly unlike that of other species of the genus.

Specimens from Kwala Aring in the Malay Peninsula identified by me as *C. atomaria*, Selys (*Proc. Zool. Soc. Lond.*, 1902, p. 356) are all immature and their proper designation must remain doubtful.

Legion III. PLATYSTICTA, nov.

Rather large or moderate-sized Agrionid dragonflies, with a long and rectangular quadrilateral, without supplementary sectors. *Ab* absent, or (probably) represented by a nerve descending *from the lower side of the quadrilateral* to join *Ac* or the hinder margin of the wing. Cu_2 represented only by Cu_{2b}. Cu_1 normal or reduced. Pterostigma trapezoidal. Wings falcate, a supplementary basal post-costal nerve always present. Body generally very slender, legs with long cilia.

Distribution :—Tropical America, Tropical Asia to New Guinea.

The distinctness of the forms included in this new 'Legion' from the *Protoneura—Disparoneura* series, can scarcely be questioned, especially when the more primitive members of each series are compared together.

The following are the genera of the 'Legion' with their differentiating characters :—

A. Cu_1 extending beyond half the wing length.

PALAEMNEMA, Selys.

Type: *P. paulina* (Drury).
Distribution: Tropical America.

B. Cu_1 not reaching half the length of the wing.

I. *RS* markedly fractured.

Ab present, joining *Ac*. Sectors of arculus not stalked.

PLATYSTICTA, Selys.

Type: *P. maculata*, Selys.
Distributions: Ceylon, S. India.

II. *RS* straight.

a. *Ab* present, joining *Ac*, or hinder margin of wing 'sectors of arculus' stalked.

DREPANOSTICTA, nov.

Type: *D. carmichaeli* (Laidlaw).
Distribution: Ceylon, India, Burma, Tonkin, Malaya to New Guinea.

b. *Ab* absent.

PROTOSTICTA, Selys.

Type: *P. simplicinervis*, Selys.
Distribution: S. India, Himalaya, Malay Peninsula, Borneo, Celebes.

The distinction between *Drepanosticta* and *Protosticta* is not of great importance, and is liable in individual cases to break down.

The two genera may, however, be retained at least as a matter of convenience.

I have not found it possible to hit on a good character to further sub-divide the genus *Drepanosticta* though it is likely that the genus can be further broken up. I have been able to examine some seven species of the genus, for the purpose of defining the genus, and I find that the point of attachment of '*Ab*,' and likewise the point of origin of M_3 and *Ms*, shows a certain amount of individual variation.

On the whole the Ceylon species have the least reduced venation. I have selected *D. carmichaeli* as type of the new genus because it is a well-characterized species, and with a fair number of specimens at hand I have been able to deposit a paratype in the British Museum and in my own collection.

Genus **Platysticta**, Selys.

Platysticta deccanensis, Laidlaw.

Platysticta maculata deccanensis, Laidlaw, *Rec. Ind. Mus.* XI, p. 388, text-fig. 1 (1915).

Length of hind-wing 34 mm., of abdomen 46 mm. Post-nodals on fore-wing 22–23. Pterostigma one and a half times as long as it is broad, covering more than one cell, brown with a fine white margin.

Head.—Upper surface black, basal half of upper lip, ante- and post-clypeus bluish-white.

Prothorax brown, its anterior lobe yellowish-white.

Thorax rich cinnamon-brown, paler below, the mid-dorsal carina and alar sinuses black.

Abdomen.—Segments 1–2 dark brown with lighter brown marks on the sides, 3–7 very dark brown, black at the articular rings, 8–9 pale blue above, black below, 10 black.

Anal appendages black. Upper pair more than twice as long as segment 10, sharply bent down at the middle. Lower pair nearly straight, hooked inwards at their extremity.

Legs brown, articulation of the femurs yellow, cilia brown.

The Museum collection also includes a female belonging to this genus and probably to the present species from Cochin State (Forest Tramway: mile 10–14, alt. 0–300 ft., 28-ix-14, No. 8272/20, taken by Mr. Gravely). The colouring of the head and prothorax agrees with that of the males described above. The thorax is black above, with bluish-white antehumeral bands; brown at the sides and paler below. The abdomen is brown with lilac coloured lateral spots on segment 10.

Length of hind-wing 28 mm., of abdomen 36 mm.

Platysticta maculata, Selys.

Platysticta maculata, Kirby, *Cat. Odonata*, p. 132 (1890).

A species apparently confined to Ceylon. A specimen in the British Museum labelled *Platysticta tropica*, from Ceylon, is also a true *Platysticta*. I have not had opportunity to satisfy myself as to the correctness of the specific determination, but it appears distinct from *P. maculata*, Selys, and *apicalis*, Kirby.

Platysticta apicalis, Kirby.

Platysticta apicalis, Kirby, *Journ. Linn. Soc. Lond.* (Zool.) XXIV, p. 561, pl. xlii, fig. 1, ♀ (1893).

Like the last confined to Ceylon. The only old-world species of the Legion with coloured wings.

Genus **Drepanosticta**, nov.

Drepanosticta carmichaeli (Laidlaw).

(Pl. xiv, figs. 1, 4; pl. xv, fig. 5)

Protosticta carmichaeli, Laidlaw, *Rec. Ind. Mus.* XI, p. 390, fig. 3 (1915).

Kalimpong, 500–4,500 ft., No. 74/H.I., April 1915 (*F. H. Gravely*).

Pashok, 2,500 ft., Nos. 3410/H.I., 3441/H.I., 3801/H.I., 3411/H.I., May-June, 1916 (*F. H. Gravely*).

The type specimen and others secured with it were in a bad state of preservation and give no idea of the beautiful colouring of the living insect. Fortunately fresh material enables me to remedy the defective description given in my first notice of the species.

Venation.—Vestige of *Ab* entirely separated from *Ac*. Sectors of arculus with long stalk. M_3 descending from subnodal vein. *RS* distal 13–16 postnodals on front wing.

Head.—Upper lip, genae and anteclypeus pale blue. Postclypeus and frons to level between the anterior ocellus and posterior pairs black, second joint of antennae pale blue. Irregular pale blue band across vertex from in front of posterior ocelli to occiput, the latter black Eyes pale blue, with an equatorial band of grey, wider in front.

Prothorax olive-green dorsally, becoming laterally pale blue, sides and under surface rich brown-black.

Thorax olive-green dorsally, fading to pale blue humeral stripes, succeeded by golden-brown colour at the sides. This in passing ventrally becomes intensified to brown-black. A pale, silvery blue line on the second lateral suture.

Abdomen brown, segment 2 with a longitudinal, blue band dorsally. Segments 3–6 have a narrow, pale blue mark at the base and a dark ring apically; 7 except for a bright blue spot at the base dorsally is black, 8–9 brilliant light blue, 10 black with dorsal blue mark.

Anal appendages black. *Legs* yellowish-white.

Length of hind-wing 24 mm., of abdomen 36 mm.

The female specimens are teneral and in bad preservation. The colouring appears to be similar to that of the male, except that segment 8 of the abdomen is dark coloured.

A male (No. 3410/H.I.) has a remarkable abnormality of the vestigial *Ab* on the right hind-wing. On this wing the vestige consists of two transverse nerves united by a minute cross-vein so as to be H-shaped.

A second male (No. 3801/H.I.), in poor condition, has lost this vestige altogether on the right hind-wing, so that evidently the distinction between *Drepanosticta* and *Protosticta* occasionally breaks down in this species at least.

Genus **Protosticta**, Selys.

Protosticta gravelyi, Laidlaw.

Protosticta gravelyi, Laidlaw, *Rec. Ind. Mus.* XI, p. 390, text-fig. 2 (1915).

1 Talewadi, near Castle Rock, N Kanara District, 3-x-16 (*S. Kemp*). No. 4389/H.I.

♀ Adult. *Head* as in the male; it should be added that the dorsal surface of the eyes is black, the rest a grayish-white.

Prothorax and *thorax* as in the male.

Abdomen black, segments 3–8 each with a white basal ring relatively small on segments 1–7, but occupying about one-half of the length of segment 8; increasing gradually from segments 1–7 on the last of which it is actually larger than on segment 8. These rings are more extensive on the sides and ventral surface of the segments than they are dorsally. Segment 9 is entirely black. Length of hind-wing 20·5 mm., of abdomen 40 mm.

The nerve referred to as Cu_2 in the original description of the male is the nerve I now regard as *Ac*.

Protosticta himalaiaca, sp. nov.

(Pl. xv, fig. 6).

Kalimpong, Darjiling district, 500–4,500 ft.

Pashok, 5,500 ft., May-June, 1916. No. 3465/H.I.

Kalimpong, teneral and in bad condition.

The representatives of this fine large species are unfortunately all somewhat immature, so that it is possible that the colouring of the male when quite adult may differ from the description given below. As the species should be very readily refound, I think it worth while to give it a name.

♂ Juv. *Head.*—Upper lip whitish edged with black, anteclypeus and genae creamy-white, the rest of the upper surface metallic black, with green reflex.

Prothorax black above, with indications of pale lateral lines, creamy-white below.

Thorax metallic black as far as first lateral suture, sides and under surface creamy-white with broad black lateral band along second lateral suture.

Abdomen brown, each of segments 2–9 with black apical ring, and 3–7 with whitish apical ring (probably blue in the adult), widening on the sides. Apical half of 8–9 whitish (or blue in the adult); 10 entirely brown.

Anal appendages.—Upper pair about equal in length to segment 10, light brown, curved downwards, the distal half blade-like. Lower pair white, slender, cylindrical, a little longer than the upper pair, incurved at the extremity. Each carries a small inwardly directed spur at its middle.

♀ Colouring as in male, but segments 8–10 of the abdomen entirely brown.

Length of hind-wing 30 mm. Post-nodals 15–17 on forewing.

I have examined an imperfect, immature male of this species sent to me by Mr. H. Stevens.

The species of the genera *Drepanosticta* and *Protosticta* will in all probability turn out to be numerous and I am inclined to think that the habitats will also prove quite restricted. *Drepanosticta quadrata* (Selys) is recorded from the Malay Peninsula and Burma; I cannot feel sure that the Burma specimen is co-specific with the Peninsular insect.

Legion IV. PROTONEURA, Selys (restricted).

Agrionid dragonflies, with a long and rectangular quadrilateral without supplementary sectors.

Ab normal, vestigial or absent; never attached to the quadrilateral.

Cu_2 represented only by Cu_{2b}, or absent. Cu_1 normal, reduced or absent. Pterostigma rhomboidal. No supplementary basal post-costal nerve. Wings not falcate. Size moderate, body slender, or very slender. Legs with long cilia.

Distribution:—Africa (excl. Madagascar ?), Tropical Asia, and Australasia, Tropical America.

I have but little acquaintance with American forms of the Legion. I take their relationship to Old World forms as a matter of course.

The following table shows the grouping of regional genera which I suggest, and indicates the characters on which I rely to establish them:—

A. *Ac* lies at a level about midway between the two costal antenodal nerves.
  I. *Ab* normal (*i.e.* meeting the nerve descending from the distal end of the quadrilateral (Cu_{2b}).
    Hinder margin of prothorax of female crenate or dentate.
    a. Wings broad (length to breadth 4 : 1). Cu_1 reaching hinder margin of wing beyond half the wing length. Body rather stout. Wings of males coloured.

CHLORONEURA, gen. nov.

Type: *C. quadrimaculata*, Ramb.
Distribution: Central India.

b. Wings narrow (length to breadth 9 : 2). Cu_1 reaching hinder margin of wing before half the wing length. Body slender. Wings of male uncoloured.

Disparoneura, Selys.

Type : *D. frenulata*, Selys.
Distribution : Africa, Tropical Asia to Borneo.

II. *Ab* reduced or absent (*i.e.* when present not meeting Cu_{2b}).

a. *Ab* present, Cu_1 reaching to half the wing length on the hinderwing. Posterior prothoracic margin of female simple.

Indoneura, gen. nov.

Type : *I. gomphoides* (Ramb.).
Distribution : W. Peninsular India.

b. *Ab* present as a vestige or absent. Cu_1 not reaching half the wing length of hinder wing. Posterior prothoracic margin of female not simple.

Caconeura, Kirby.

Type : *C. dorsalis*, Selys.
Distribution : Ceylon, Burma, Malaya.

B *Ac* lies at about level of first antenodal or proximal to it.

Nosoticta and other Papuan and Australasian genera ; not regional.

Disparoneura westermanni, Selys, is not represented in the Museum collection, and is not known to me.

Genus **Chloroneura**, nov.

This monotypic genus, which is peculiar to Central India, ranges apparently from the neighbourhood of Bombay, through the West Ghauts as far at any rate as Nagpur in the Central Provinces, but the limits of its distribution are not at all known.

It is perhaps more primitive than the true *Disparoneura*, to which it is very closely allied. The form of the anal appendages of the male and of the posterior prothoracic margin of the female of the two genera are extremely similar.

Chloroneura quadrimaculata, Ramb.

Disparoneura quadrimaculata, Kirby, *Cat. Odonata*, p. 133.
,, ,, Laidlaw, *Rec. Ind. Mus.* XI, p. 391 (1915).

Medha, Yenna Valley, Satara District.
Nagpur, C. P. (*E. D'Abreu*).

Genus **Disparoneura**, Selys.

The type of the genus was a species identified by Selys in his *Synopsis* as the *Agrion glaucum* of Rambur. Unfortunately Rambur's species turns out to be an *Enallagma* (see Calvert, *Trans. Amer. Ent. Soc.*, XXV, p. 40 ; 1898).

Hence at the present time some doubt exists as to the type species of the genus. Selys, however, gives *Agrion frenulatum*, of

Drégé, as a synonym for his type, and remarks of his second species of the genus, *Disparoneura frenulata*, that it is difficult to separate it from *Disparoneura glauca*. Hence we cannot be very wide of the mark in taking *Disparoneura frenulata*, Selys, as the provisional type of the genus.

The definition given above encloses a group of species ranging from Africa through peninsular India, Burma, the Malay Peninsula, to Sumatra and Borneo, which is, I think, a very natural one.

Besides the type species, of which we have fortunately admirable figures, given by Dr. Ris (*Sitzungsberich. d. Kais. Akad. d. Wissensch. in Wien*, mathem.-naturw. Klasse, Bd. CXXI, Abt. 1, Apr. 1912, pp. 12–14, text-figs. 7–9), there are probably other African species. In Asia there are in addition to the two new species described below, *D. analis*, Selys, ranging from the Malay Peninsula to Sumatra and Borneo, the closely allied *D. atkinsoni*, Selys, from Burma and lastly *D. aurantiaca*, Selys, from Borneo. All these species, in addition to the generic characters given above, have rather dull colouring, mostly black and yellow, with the anal appendages of the males very similar in structure, the upper pair being provided in each case with a large ventral spur or tooth.

There are, besides, three or four species from Ceylon, which may form a small group within the genus.

Disparoneura tetrica,[1] sp. nov.

3 ♂ 2 ♀ Talewadi, N. Kanara Distr., Oct. 1916, No. 4389/H.I. (*S. W. Kemp*).

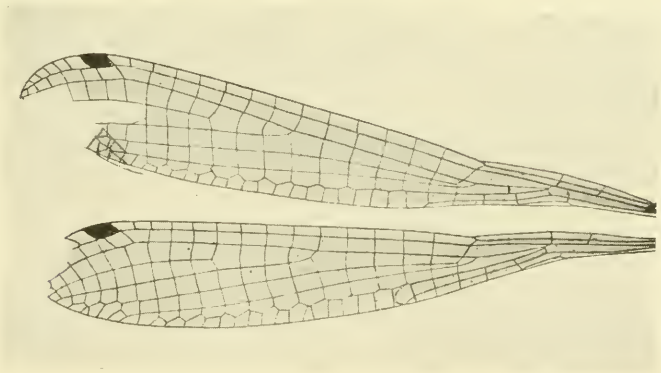

FIG. 4.—*Disparoneura tetrica*, sp. nov.
Wing photograph of ♂.

Length of hind-wing 18·5 mm., of abdomen 27–28 mm.

Post-nodals on fore-wing 12–13. Cu_1 reaching the hinder margin of the wing 3 cells beyond the sub-nodus on the hind-wing.

[1] Tetricus = sombre.

Pterostigma brownish-black, rather large, covering one and a half cells.

♂ Adult. *Head.*—Genae and anteclypeus bluish-white, the rest of the dorsal surface velvety black. Eyes with a black equatorial belt, below this pale bluish-white, immediately above it a zone of the same colour, upper pole grey-black.

Prothorax.—Dorsum and sides entirely black, under surface yellowish-white, posterior margin simple.

Thorax.—Dorsum black as far as the level of the first lateral suture; sides and under surface yellowish-white, with an irregular black band along the second lateral suture, not enclosing the stigma.

Abdomen dark brown, with a yellow mark on the sides of segments 1–2, and a black terminal ring on 3–7, preceded by a small, ill-defined postero-lateral lunule of whitish-blue colour on either side of these segments, 8–10 black. Posterior margin of 10 projecting a little in the middle line.

Anal appendages brown, upper surface and extremity of upper pair white. Viewed from above the upper pair have each a prominent white projection at their outer extremities, their inner margins are crescentic; in profile they are obliquely truncate, with a strong downwardly directed ventral tooth. Lower pair rapidly tapering and incurved at their extremities (text-fig. 5).

Fig. 5.—*Disparoneura tetrica*, sp. nov. Anal appendages ♂.

Legs yellowish-white. Posterior surface of femurs, lateral margins of tibias, spines and tarsi black.

♀ Adult. Resembles adult male, but the abdominal colours are more vivid, and there is a yellowish-white lateral spot on abdominal segments 8–9.

♀ Juv. Upper lip brown, also brown markings on the post-clypeus and a narrow brown band running traversely from eye to eye across the base of the antennae. There is also a brown spot on either side of the middle lobe of the prothorax and distinct traces of brown antehumeral bands occur on the thorax. Otherwise as in the adult female. The hinder margin of the prothorax carries two small projections directed upwards and a little forwards.

Types in the Indian Museum. Paratype in my own collection.

Disparoneura nigerrima, sp nov.

1 ♂ Nagpur, Central Provinces 1,000 ft., September, 1916 (*E. D'Abreu*).

Length of hind-wing 16·5 mm., of abdomen 25 mm.

Post-costals on fore-wing. Cu_1 reaches hinder margin of hind-wing 2 or 3 cells beyond the sub-nodus. Pterostigma brown, small, covering about one-half of a cell.

♂ Adult. Colouring black, with the following exceptions :—

Head.—Upper lip with a narrow white margin, genae bluish-white, eyes of the same colour, darkening towards the upper pole.

Prothorax and *thorax.*—Ventral surfaces yellowish-white.

Abdomen.—Segments 1–2 brownish-white ; 3–5 with small postero-lateral whitish lunules on either side of the segment.

Anal appendages.—Apex of the upper pair white, lower pair dark brown. Viewed from above the upper appendages are triangular, the outer margins parallel to each other, and the apices are prolonged to form a fine projection. In profile they appear bifid (text-fig. 6).

The lower pair are relatively more massive than in the last species.

This is the smallest member of its genus ; it is also the first recorded from Central India.

Fig. 6.—*Disparoneura nigerrima*, sp. nov. Anal appendages ♂.

Disparoneura atkinsoni, Selys.

Disparoneura atkinsoni, Kirby, *Cat. Odonata*, p. 133 (1890).

The Burmese representative of the genus. Closely allied to *D. analis*, Selys, from Malacca, Sumatra and Borneo, but larger.

Genus Indoneura, Kirby.

Unless, as is not unlikely, *D. westermanni*, Selys, is congeneric with *Indoneura gomphoides* (Ramb.), the genus is monotypic.

The simple structure of the hinder margin of the prothorax of the female is I think an important character, though a sexual one. The type species is very considerably larger than any of the species of the genus which stands next to it (*Caconeura*), and the dense reticulation of the wings points, I think, to the genus being a primitive one.

Indoneura gomphoides (Ramb.)

(Pl. xv, fig. 7).

Disparoneura gomphoides, Kirby, *Cat. Odonata*, p. 134 (1890).

1 ♂ 1 ♀ Talewadi, S. Kanara Distr., No. 4376/H.I.

Length of hind-wing 26 mm., of abdomen 38 mm.

,, ,, ,, ,, 29 mm., ,, ,, 39 mm.

Both specimens are fully adult. The female has not been described.

♀ Adult. *Head.*—Upper lip metallic black, edged with brown. Ante- and post-clypeus metallic black ; genae blue. The rest of the dorsal surface dull black. Eyes, lower two-thirds blue, upper third dull black.

Prothorax black, its anterior lobe blue, blue marks on the sides of the middle lobe.

Thorax.—Dorsum bronze-black as far as the level of the first lateral suture, with narrow blue antehumeral bands. Sides blue with a black band along the second lateral suture. Under surface yellowish-white.

Abdomen bronze-black. Segment 1 light blue above, with a large square black mark, segments 8–10 each with a blue mark on the dorsum.

Legs black.

The specific name is given, I imagine, on account of the gomphonic-like appearance of the anal appendages of the male (text-fig. 7).

Fig. 7.—*Indoneura gomphoides* (Ramb.). Anal appendages ♂.

The female type will be returned to the Indian Museum, with the male specimen.

Genus **Caconeura**, Kirby.

Caconeura sita, Kirby.

Disparoneura sita, Kirby, *Journ. Linn. Soc.* (Zool.), XXIV, p. 563 (1893).

I have examined the specimens in the British Museum. The species appears to be a true *Caconeura*.

[In Mr. Laidlaw's previous papers in this Journal (vol. xii, p. 135 and vol. xiii, pp. 31 and 39) the localities "Gopal, Assam" and "Gopaldhara in Assam" should read "Gopaldhara in the Darjiling district."—*Ed.*]